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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/963,790	09/27/2001	Mike Farwick	32301WD230	9133

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EXAMINER	
KERR, KATHLEEN M	

ART UNIT	PAPER NUMBER
1652	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/963,790	FARWICK ET AL.	
	Examiner	Art Unit	
	Kathleen M Kerr	1652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *26 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29* is/are pending in the application.

4a) Of the above claim(s) *10,11,13-26,28 and 29* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,6,7,12 and 27* is/are rejected.

7)☒ Claim(s) *5 and 9* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *3/20/02* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *alignments (Z77137, EP1108790).*

DETAILED ACTION

Application Status

1. In response to the previous Office action, a written restriction requirement (mailed on September 9, 2003), Applicants filed an election received on September 26, 2003. Claims 1-29 are pending in the instant Office action.

Election

2. Applicants' election of Group I, Claims 1-9, 12 and 27 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (M.P.E.P. § 818.03(a)).

The requirement is deemed proper and is therefore made FINAL.

Claims 1-29 are pending in the instant Office action. Claims 10, 11, 13-26 and 28-29 are withdrawn from further consideration as non-elected inventions. Claims 1-9, 12 and 27 will be examined herein.

Priority

3. The instant application is granted the benefit of priority for the foreign application 100 47 865.4 filed in Germany on September 27, 2000 as requested in the declaration. Receipt is acknowledged of papers submitted under 35 U.S.C. § 119(a)-(d), which papers have been placed of record in the file. Said papers are not in English and thus, cannot be used to provide evidence of an earlier effective filing date for the pending claims.

Information Disclosure Statement

4. The information disclosure statement filed on March 20, 2002 has been reviewed, and its references have been considered as shown by the Examiner's initials next to each citation on the attached copy. The search report has been reviewed but is crossed out on the IDS since it is not printed on the face of a patent.

Declaration

5. The Examiner notes that the declaration filed December 18, 2001 has the box checked "attached hereto" concerning the specification; however the specification was previously filed on September 27, 2001. This is considered a typographical error since the title and inventors names match that filed on September 27, 2001; the declaration is adequate for the instant application. No action is required by Applicants.

Sequence Compliance

6. By virtue of the sequence listing filed on February 14, 2002 listing 4 sequences and the statement under 37 C.F.R. § 1.821(f), the instant application fully complies with the sequence rules.

Objections to the Specification

7. In the specification, the Abstract is objected to for not completely describing the disclosed subject matter (see M.P.E.P. § 608.01(b)). It is noted that in many databases and in foreign countries, the Abstract is crucial in defining the disclosed subject matter, thus, its

completeness is essential. The Examiner suggests the inclusion of the activity of the deaD protein as well as the source species, *Corynebacterium glutamicum,* for completeness.

8. The specification is objected to for having out-dated application serial numbers embedded. On page 17, paragraph 0052, 09/396,478 is disclosed; said application is now USPN 6,586,214. Correction is required.

9. The specification is objected to for being confusing on page 23, in Example 23. The section is entitled "Preparation of the expression vector induced expression of the deaD gene pXK99EdeaD for IPTG-in C. glutamicum"; however, as clearly described in paragraph 0079, only a fragment of the deaD gene is in the vector since this vector is used for attenuation, not expression of the full-length protein. Thus, the title of the Example is confusing. Clarification is required.

Claim Objections

10. Claims 5 and 9 are objected to for depending from rejected claims.

Claim Rejections - 35 U.S.C. § 112

The following is a quotation of the second paragraph of 35 U.S.C. § 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1-4, 6-8, and 27 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In Claim 1, the phrase "from coryneform bacteria" is unclear

as to its metes and bounds. Does this phrase limit the claimed polynucleotides to those native to coryneform? Or can any polynucleotide that can be found in coryneform, recombinantly or otherwise (i.e., an *E. coli* gene can be on a plasmid transformed into coryneform) read on the claim? Clarification is required. The Examiner suggests the term ---native to--- for clarity.

12. Claims 1-4, 6-8, and 27 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "codes for the deaD gene" is unclear. Firstly, a polynucleotide sequence does not "code for" a gene; polynucleotides are genes that code for (or encode) polypeptides. Thus, this limitation is unclear. Secondly, which *deaD* gene is intended? The term "**the** deaD gene" (emphasis added) indicates a particular *deaD* gene, for example SEQ ID NO:1; however, tremendous breadth of structure in the claimed genus follows this term. Thirdly, items c and d are wholly unclear considering any encoding limitation since item c is drawn to the complement of a coding sequence and d is drawn to small fragments. Thus, the metes and bounds of the instant claims are unclear.

13. Claim 7 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "further comprising ... sense mutations of neutral function" is unclear. Since a DNA's function is to encode a protein, does this phrase mean within the degeneration of the genetic code (already claimed in Claim 6, item ii)? Or is the retention of the function of the encoded protein intended? The phrase is wholly unclear. Moreover, must the DNA of Claim 6 also have this limitation or is it another option to be added to Claim 6 as implied by the item

number "iv"? If it is another option added, Claim 7 does not further limit the parent claim appropriately. Clarification is required.

The following is a quotation of the first paragraph of 35 U.S.C. § 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 1-4, 6-8, and 27 are rejected under 35 U.S.C. 112, first paragraph, written description, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 1, 3, 4, 8 and 27 are drawn to polynucleotides having a particular structure, although limited, without any function. Claims 6-7 require no particular structure due to the breadth of "hybridizes" in Claim 6, item iii, and no particular function. Claim 2 requires only limited structure (see Claim 1, item d) that does not necessarily support the claimed function.

The Court of Appeals for the Federal Circuit has recently held that a "written description of an invention involving a chemical genus, like a description of a chemical species, 'requires a precise definition, such as be structure, formula [or] chemical name,' of the claimed subject matter sufficient to distinguish it from other materials." University of California v. Eli Lilly and Co., 1997 U.S. App. LEXIS 18221, at *23, quoting Fiers v. Revel, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993) (bracketed material in original). To fully describe a genus of genetic material, which is a chemical compound, applicants must (1) fully describe at least one species of the claimed

genus sufficient to represent said genus whereby a skilled artisan, in view of the prior art, could predict the structure of other species encompassed by the claimed genus and (2) identify the common characteristics of the claimed molecules, e.g., structure, physical and/or chemical characteristics, functional characteristics when coupled with a known or disclosed correlation between function and structure, or a combination of these.

The instant specification discloses polynucleotides encoding polypeptides with at least 70% identity with SEQ ID NO: 2. Applicants have described a genus relating to said SEQ ID NO with both sequence identity limitations and functional limitations (i.e., having DNA/RNA helicase activity activity). However, the genus of the instant claims also contains polynucleotides within the sequence identity limitations, but having different function. Moreover, based on the limited structural limitation for the broadest interpretation of Claim 2, this claim is also included in the instant rejection. Additionally, no description of polynucleotides derived "from coryneform" is found to the exclusion of any deaD gene to adequately describe the claimed subgenus. Applicants have not fully described a genus that has sequence identity limitations in the absence of clear functional limitations.

15. Claims 1-4, 6-8, and 27 are rejected under 35 U.S.C. § 112, first paragraph, scope of enablement, because the specification, while being enabling for any polynucleotide encoding SEQ ID NO:2 (a deaD gene), does not reasonably provide enablement for polynucleotides encoding polypeptides having as little as 70% identity with SEQ ID NO:2. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims. To make the claimed product commensurate with the claimed scope would require undue experimentation.

The factors to be considered in determining whether undue experimentation is required are summarized In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir, 1988). The Court in Wands states: "Enablement is not precluded by the necessity for some experimentation such as routine screening. However, experimentation needed to practice the invention must not be undue experimentation. The key word is 'undue,' not 'experimentation.' " (Wands, 8 USPQ2d 1404). Clearly, enablement of a claimed invention cannot be predicated on the basis of quantity of experimentation required to make or use the invention. "Whether undue experimentation is needed is not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations." (Wands, 8 USPQ2d 1404). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of experimentation necessary, (2) the amount or direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. While all of these factors are considered, a sufficient amount for a *prima facie* case is discussed below.

The instant specification teaches SEQ ID NO:2, a DNA/RNA helicase, deaD, from *C. glutamicum*, and SEQ ID NO:1, a *C. glutamicum* gene exactly encoding SEQ ID NO:2. The art fully enables any DNA encoding SEQ ID NO:2 based on the degeneracy of the genetic code. While the instant specification describes and enables means for identifying other deaD genes using hybridization methods, etc., these methods do not enable one of skill in the art to make all, or a relevant portion of, the polynucleotide products within the scope of the claims because the ability to find a deaD gene, which is structurally related to SEQ ID NOs:1 and/or 2, is not

equivalent to the ability to make a deaD gene as required by the statute (i.e., "make and use"). No description in the specification or the art provides particular residues whose encoding is important within the disclosed sequence so that its deaD-nature is maintained. Thus, one of skill in the art would be unable to predict the structure of the other members of the genus in order to make such members. Therefore, the instant claims are not enabled to the full extent of their scope.

16. Claim 12 is rejected under 35 U.S.C. § 112, first paragraph, enabling deposit, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. To practice the instant methods, one of skill in the art is required to have DSM 14464, which is disclosed as containing pXK99EdeaD, or is required to have all the components to produce pXK99EdeaD. The components are not readily available, and the deposit fails to fully enable the claims. While the instant specification contains limited deposit information (see page 19), the requirements to enable such a deposit have not been fully met by the instant application. To enable the instant claims by enabling the deposit of DSM 14464, the following items are required: (1) the accession number assigned by the depository, (2) the date of deposit, (3) a brief description of the deposit, (4) the name and **full address** of the depository (37 C.F.R. § 1.801 - 1.809) (those which are in bold have not been fulfilled by the instant specification), and (5) the record must also contain a statement certifying that all restrictions on accessibility to said deposit be irrevocably removed by Applicant upon the granting of the patent (see M.P.E.P. § 2404.01); this statement may be certified by Applicants or Applicants' representative.

Claim Rejections - 35 U.S.C. § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

17. Claims 1-4, 6-8 and 27 are rejected under 35 U.S.C. § 102(a) as being anticipated by Nakagawa *et al*. (EP 1108790, see IDS). The instant claims are drawn to polynucleotides similar to a nucleic acid encoding SEQ ID NO:2 and *C. glutamicum* that overexpress the deaD gene.

Nakagawa *et al*. (EP) teach SEQ ID NO:7062, a portion of which (310000-312380 bp) is virtually identical to SEQ ID NO:1 (1-2381 bp), except for two point mutations that result in a single amino acid change in the translated protein (see attached alignment). Nakagawa *et al*. (EP) teach this portion of SEQ ID NO:1 as homologous to DEAD box ATP-dependent RNA helicase deaD (see page 103). Nakagawa *et al*. (EP) also teach overexpression of the disclosed sequences in *C. glutamicum* to produce the encoded polypeptides (see page 22).

18. Claims 1-4, 6-8 and 27 are rejected under 35 U.S.C. § 102(a) as being anticipated by Nakagawa *et al*. (USPAP 2002/0197605, see PTO-892). The instant claims are drawn to polynucleotides similar to a nucleic acid encoding SEQ ID NO:2 and *C. glutamicum* that overexpress the deaD gene.

Nakagawa *et al*. (USPAP) teach SEQ ID NO:1, a portion of which (1210000-1212380 bp) is virtually identical to SEQ ID NO:1 (1-2381 bp), except for two point mutations that result

in a single amino acid change in the translated protein (see alignment for Nakagawa *et al.* (EP)). Nakagawa *et al.* (USPAP) teach this portion of SEQ ID NO:1 as homologous to DEAD box ATP-dependent RNA helicase deaD (see page 68). Nakagawa *et al.* (USPAP) also teach overexpression of the disclosed sequences in *C. glutamicum* to produce the encoded polypeptides (see page 18).

19. Claims 1-3 and 6-8 are rejected under 35 U.S.C. § 102(b) as being anticipated by Cole *et al.* (GenBank Accession Z77137, see IDS). The instant claims are drawn to DNA encoding an RNA helicase and having at least 15 successive base pairs of a sequence that encodes SEQ ID NO:2 that will hybridize to said sequence.

Cole *et al.* teach *M. tuberculosis* DNA encoding a putative RNA helicase that exactly encodes SEQ ID NO:2 (285-307 aa) from 1631-1699 base pairs (see attached alignment).

Other Relevant Art

20. The following is cited to complete the record for the reasons noted:

a) Luking *et al.* The protein family of RNA helicases. Critical Reviews in Biochemistry and Molecular Biology (1998) 33(4):259-296.

Allowable Subject Matter

21. The closest prior art to the *C. glutamicum* RNA helicase, deaD, gene claimed in the instant application is that of deaD genes from *M. tuberculosis* and *K. pneumoniae* (see IDS for citations). These DNAs encode proteins that are 52% and 45% identical to SEQ ID NO:2, respectively. Exactly SEQ ID NO:1 (Claim 5) and any DNA encoding SEQ ID NO:2 (Claim 9)

are free of the prior art, particularly of disclosures by Nakagawa *et al.*, due to two mismatches within the DNA sequence that result in a single amino acid change in the encoded protein. The Examiner notes that with a properly filed translation of Applicants' priority document, Nakagawa *et al.* prior art references herein would no longer be considered prior art.

Conclusion

22. Claims 1-4, 6-8, 12, and 27 are rejected for the reasons identified in the numbered sections of this Office action; Claims 5 and 9 are objected to. Applicants must respond to the objections/rejections in each of the numbered sections in this Office action to be fully responsive in prosecution.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kathleen M Kerr whose telephone number is (703) 305-1229. The examiner can normally be reached on Monday through Friday, from 9:00am to 6pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ponnathupura Achutamurthy can be reached on (703) 308-3804. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0196.

Kathleen M Kerr
Examiner
Art Unit 1652

December 11, 2003